

Initial Assessment (30 min)

Question 1 (click [here](#) to download the dataset):

The linked 2*300 Matlab array stores the spectral power obtained from a test subject participating in a memory game for a certain duration of interest. The columns represent the successful and unsuccessful conditions, respectively; the rows represent the trials.

Evaluate if the observed power is significantly different across the two conditions and report the results. Justify your choice of statistical method in a line or two.

Question 2:

Create four individual sine waves and a mixed wave.

Take four frequencies: 2 Hz, 8 Hz, 12 Hz, and 25 Hz. Create four sine waves of 4 s duration, sampled every 1 ms. Choose different amplitudes and different phase lags of your choice. [Hint: It's the Class XII physics formula; nothing fancy but feel free to Google.]

Now just average the four waves to get the mixed wave.

- Plot the four individual waves and the mixed wave in a 5*1 panel.
- Can you recognize the involved frequencies in the mixed wave from the plot?
- If not, can you do the necessary processing to recover this information (use Google)?

Question 3:

To all of the individual waves, add different amounts of white noise, plot, and redo the frequency recovery.